REMARKS

The foregoing amendments and these remarks are in response to the Office Action dated May 19, 2004. This amendment is timely filed.

At the time of the Office Action, claims 1-7 and 9-18 were rejected under 35 U.S.C. §103(a). Claims 19-26 were allowed. Claim 8 was objected to as being dependent upon a rejected base claim, but the Examiner indicated that the claim would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

I. Review of Applicant's Invention

Prior to addressing the Examiner's rejection on art, a brief review of Applicant's invention is appropriate. The invention concerns an improvement to broadband base stations that operate simultaneously on a plurality of transmit and receive carrier frequencies. In these types of broadband base stations, it is advantageous to provide a flat spectral response for all frequencies to be used. In other words, the base station response in both the transmit and receive directions should be relatively flat across the entire operational frequency spectrum that includes the various transmit and receive carrier frequencies. This flattening is accomplished in the present invention using software amplitude predistortion.

More specifically, a generic set of coefficients can be stored that are representative of amplitude distortions occurring as a result of signal conversions between analog and digital formats in the base station transceiver. At least one set of transceiver specific coefficients are also stored. The generic set of coefficients are common to all A/D conversion devices and therefore do not need to be specific to a particular base station. However, the transceiver specific coefficients are representative of amplitude distortions associated with a specific broadband base station RF transceiver. Significantly, by using these two different types of data sets, an amplitude response of the specific broadband base station RF transceiver can be effectively equalized at a plurality of transmit and receive carrier frequencies within a selected one of the relatively narrow band segments.

According to one aspect of the invention, at least one set of the transceiver specific coefficients can be advantageously selected to include a first set of transceiver specific coefficients that are representative of amplitude distortions exclusive to narrowband processing within the specific broadband base station transceiver. Further, a second set of transceiver specific coefficients can be selected that are representative of amplitude distortions associated with wideband signal processing within the specific broadband base station transceiver. The first and second sets of transceiver specific coefficients can be concurrently applied to transmit and receive carrier frequencies to perform the software amplitude pre-distortion.

II. Claim Rejections on Art

Turning now to the Examiner's rejection, it is noted that Claims 1-7 and 9-11 were rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 6,275,685 to Wessel et al, ("Wessel") in view of U.S. Patent No. 5,251,328 to Shaw ("Shaw"). Claims 12-18 were rejected under 35 U.S.C. §103(a) as being unpatentable over U. S. Patent No. 6,223,056 to Appel ("Appel") in view of Wessel and Shaw.

A. Description of the Asserted Prior Art

Appel discloses a power controller for controlling power consumption of a power amplifier in the base station. The power controller adjusts an RF primary power level to maintain a power ratio at approximately a selected target power ratio. However, Appel's power controller does not apply pre-distortion to transmit and receive carrier frequencies. Moreover, Appel makes no attempt to flatten the spectral response of a transceiver across a range of frequencies including the plurality of transmit and receive carrier frequencies.

Wessel discloses a system for reducing amplitude and phase distortion in an RF amplifier. As explained at col. 5, lines 61-67 and col. 6, lines 1-5, amplifier distortion can distort a power spectrum of a spread spectrum modulated signal. Wessel explains that this distortion is known to produce regrowth sidebands as illustrated in Fig. 1d. In order to overcome this problem, Wessel discloses that a pre-distortion circuit and a

feedback circuit can be added to a high power amplifier. The feedback circuit produces an error signal, which is employed to modify a set of look up values. The pre-distortion circuit is an adaptive system that adjusts its gain and phase transfer functions in response to residual gain error and residual phase error signals. Actual gain and phase error correction signals are determined relative to a set of look-up values and a sample of the RF input signal to reduce complex distortion in the output signal. Notably, Wessel does not disclose flattening the output power among a plurality of transmit and receive carrier frequencies distributed within a passband of a wideband transceiver.

Shaw discloses a transceiver which supports a single bi-directional communication session. The transceiver includes means for processing signals in a communications system to determine the amplitude distortion introduced within an adjacent subscriber loop. The determined amplitude distortion is then processed and used to predistort the signals transmitted from the distortion-determining transceiver. Notably, Shaw suggests that determining the predistortion required for communications between a first transceiver and a second transceiver compensates for all or a portion of the distortion introduced within the subscriber loop. This suggestion is based on the premise that signal attenuation is the same for signals being communicated between the transceivers, regardless of which transceiver is transmitting and which transceiver is receiving.

B. Arguments

Amended claims 1, 12 and 17 of Applicants' invention each recite assigning a plurality of transmit and receive carrier frequencies to a base station wideband transceiver. Software amplitude pre-distortion is used to flatten a spectral response of the base station transceiver across a range of frequencies including the plurality of transmit and receive carrier frequencies, wherein each define an RF channel. As the Examiner notes, Wessel and Appel do not disclose this limitation. Importantly, neither does Shaw. Instead, Shaw applies predistortion only to signals transmitted in a bidirectional landline communication session. Shaw does not teach or suggest that such signals are transmitted using carrier frequencies.

Moreover, contrary to the Examiner's assertion, the combination of Wessel and Shaw does not teach or suggest flattening a spectral response across a range of carrier frequencies each defining an RF channel. Indeed, Shaw's predistortion is only applicable to the frequency response of a single channel to compensate for amplitude distortion introduced in a subscriber loop supporting the channel transmissions. Notably, Shaw makes no attempt to insure that the spectral response of the single channel matches the spectral response of other channels. Wessel provides an output which is a composite of modulated signals at different channel frequencies, but Wessel also does not provide a teaching or suggestion of matching the spectral response of the channel frequencies. Instead, Wessel merely attempts to amplify a multi-carrier signal without generating unacceptable modulation products. Hence, the combined teachings of Wessel and Shaw would not lead the skilled artisan to the solution solved by Applicants' claimed invention.

Notwithstanding that the combination of Wessel and Shaw fail to teach each of the claim limitations recited in amended claims 1, 12 and 17, the Applicants' respectfully disagree with the Examiner's assertion that it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the use of a carrier frequency, as taught by Wessel, with Shaw's predistortion of bidirectional signals. Notably, there are many distinctions between the respective disclosures. Wessel pertains to a system for reducing amplitude and phase distortion in an RF amplifier. By comparison, Shaw pertains to bidirectional landline communications. It is not common practice for such bidirectional landline communication systems to incorporate an RF amplifier as described by Wessel, or to implement communications using a carrier frequency. Thus, it appears that Wessel and Shaw have little more in common other than the fact that both communicate signals. The isolated fact that Shaw uses predistortion provides no teaching or suggestion that such a feature would be advantageous or applicable to the teachings of Wessel. Accordingly, neither Shaw nor Wessel provide motivation to combine their respective references.

Claim 2, 12 and 17 each recite discretely flattening the power in each of the plurality of transmit and receive carrier frequencies. In response to claim 2, the

Examiner has asserted that this limitation is inherent in the combination of Wessel and Shaw. Notwithstanding Applicants' belief that motivation to combine Wessel and Shaw is lacking, Applicants' respectfully disagree with this assertion. Nowhere in these references is there a teaching or suggestion to discretely flatten the power in each carrier frequency. As noted, Shaw does not even use a carrier frequency and only transmits on a single channel. Although Wessel does use RF carriers, Wessel applies a composite of modulated signals to a linearized high power amplifier (col. 6, lines 26-29). Accordingly, linear amplification is applied to a singe multi-carrier signal, and thus the operation is not discrete.

In view of the foregoing, withdrawal of the 35 U.S.C. § 103(a) rejection with respect to claims 1-7 and 9-18 is respectfully requested.

III. Allowable Subject Matter

The applicants note with appreciation that claims 19-26 have been allowed. Further, claim 8 has been objected to for being dependent on a rejected base claim, but is indicated as being allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 1, which is the base claim from which claim 8 depends, is now believed to be in condition for allowance. Accordingly, claim 8 is also believed to be in condition for allowance. Applicants therefore respectfully request that the objection be withdrawn.

IV. Conclusion

For the foregoing reasons, this entire application is believed to be in condition for allowance. Consequently, such action is respectfully requested. The Applicant requests that the Examiner call the undersigned if clarification is needed on any matter

within this Amendment, or if the Examiner believes a telephone interview would expedite the prosecution of the subject application to completion.

Respectfully submitted,

Date: 8-16-04

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